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EXAMINER	
STEELMAN, MARY J	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/055,691	Applicant(s) ANDRADE ET AL.	
	Examiner Mary J. Steelman	Art Unit 2122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/29/01, 8/1/03*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-88* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-88* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/1/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-88 are pending.

Information Disclosure Statement

2. IDS received 8/1/2003 has been considered.

Specification

3. Examiner requests an update in the Specification on pages 1 and 29.

Claim Objections

4. Claim 17 is objected to because of the following informalities: The claim must end with a period, '.'. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,603,043 to Taylor et al.,

Per claims 1, 29, 58, 59, 60, and 76:

A system / method / memory medium for debugging a program which is intended to execute on a reconfigurable device, the system comprising:

(Taylor: Col. 4, line 44, "...system...", col. 5, line 23, "...method of translating source...", col. 5, lines 27-28, "...PLDs connected to a hardware device such as...memory...", col. 11, line 26, "...can be used for debugging...", col. 7, lines 24-26, "The present invention is designed to provide hardware resources to implement...programs in...hardware...", col. 19, lines 62-63, "...reconfigured to function as a different ASIC...")

-a reconfigurable device, comprising:

a programmable hardware element; one or more fixed hardware resources coupled to the programmable hardware element; a computer system comprising a processor and a memory;

(Taylor: Col. 4, lines 43-46, "...a **configurable hardware** (programmable hardware element) system for implementing an algorithmic language program, including a programmable logic device (PLD), a hardware resource connectible to the PLD...", col. 4, lines 55-59, "The hardware resource may be a DSP, a **memory** device, or a **CPU**...", col. 5, lines 27-30, "...including PLDs connected to a hardware device such as a SDP, CPU or memory. The **PLD can be connected** (hardware resources coupled to programmable hardware element) to a device capable of processing digital instructions.")

-wherein the computer system is coupled to the reconfigurable device;

(Taylor: Col. 4, lines 47-49, "...programmable connection to the PLD...")

-wherein the memory stores the program specifying a function,

(Taylor: Col. 4, lines 60-61, "...configured to implement some or all of an algorithmic language program (specifying a function).")

-wherein the program is convertible into a hardware configuration program which specifies a configuration for the programmable hardware element that implements the function,

(Taylor: Col. 4, lines 59-61, "The hardware system is designed to provide resources which can be configured (hardware configuration program) to implement some or all of an algorithmic language program (implement the function)...")

-wherein the hardware configuration program further specifies usage of the one or more fixed hardware resources by the programmable hardware element in performing the function;

(Taylor: Col. 4, lines 59-61, "The hardware system is designed to provide resources (one or more fixed hardware resources) which can be configured (hardware configuration program) to implement some or all of an algorithmic language program (implement the function)..."), col. 5, lines 56-61, "...provide hardware resources which can be reconfigured...")

-wherein the programmable hardware element is further configurable with a test feed-through configuration,

(Taylor: Col. 11, line 2, "...monitor the status of or data in any connected DSP...", col. 11, lines 25-26, "...DSP can be used for debugging (test feed-through configuration)...")

-wherein, after configuration with the test feed-through configuration, the programmable hardware element provides for communication between the program and the one or more fixed hardware resources;

(Taylor: Col. 11, lines 1-2, "...the S-bus (provides for communication) can be used to monitor the status of or data in any connected DSP...", col. 26, lines 62-65, "Debugging is accomplished by uploading configuration data to the host (communication between the program and hardware resource). The stat of each PLD is embedded in the configuration data and this can be examined using traditional methods.")

-wherein, for debugging purposes, the program is further executable by the processor of the computer system to test performance of the function including the usage of the one or more fixed hardware resources.

(Taylor: Col. 11, lines 1-5, "In general operation, the S-bus can be used to monitor the status of or data (test performance including usage of hardware resources) in any connected SDP."

Taylor did not provide specific details related to a 'test feed-through configuration', as defined in Applicant's Specification (page 14, low level access to the fixed hardware resources on the reconfigurable board). However, Taylor did disclose that monitoring and debugging of the hardware were available, which may broadly be inferred to include a 'test feed-through configuration'. Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Taylor's invention to include specifically a 'test feed-through configuration' because simulating connected hardware peripherals is important when debugging

software that is to be convertible into a hardware configuration program. Taylor disclosed (col. 4, lines 25-29), "A reconfigurable equivalent part can be incorporated in a design, tested, and modified with no or minimal modification to physical hardware, essentially eliminating manufacturing revision costs in designing special purpose computers" and thus the motivation for a 'test feed-through configuration'.

Per claims 2, 20, 24, 29, 30, 48, 70, and 77:

-during execution of the program in the computer system, the program is operable to communicate through the programmable hardware element configured with the test feed-through configuration to invoke the one or more fixed hardware resources.

(Taylor: Col. 20, lines 39-41, "A wide variety of functions can be implemented in hardware but can be accessed (communicate) by a subroutine call (invoke hardware resources) from a main program.")

Per claims 3, 21, 28, 31, 49, 61, 71, and 78:

-execution of the program on the computer system simulates execution of the hardware configuration program on the programmable hardware element.

(Taylor: Col. 22, lines 53-56, "DSP code must ultimately operate on DSPs within the system and preferably includes configuration data for each DSP and for each configuration required to operate (execute) the system...", col. 23, lines 7-8, "...to run (execute) as a function on a hardware resource...")

Per claims 4, 22, 26, 32, 35, 50, 51, 52, 57, 62, 68, 72, 74, and 70:

-the computer system includes a display for displaying one or more panels, wherein the one or more panels display information specifying the functionality of the program.

(Taylor: Col. 8, lines 29-35, "A simple device configuration might be used as a special purpose information processor…can be connected to a simple input device such as a keyboard or…sensor…other user I/O lines can be connected to a simple output device (panel display specifying functionality of the program)…indicator light or an LED numeric display…")

Per claims 5-8, 36-39, 64-67, 81, 82, 84 and 87:

-the program is a measurement program which is executable to perform a measurement function / automation function / simulation function / control function.

(Taylor: Col. 5, lines 36-40, "…includes translating source code instructions selected from the group consisting of a C operator such as a mathematical or logical operator, a C expression, a thread control instruction (control functions), an I/O control instruction (control functions), and a hardware implementation instruction .", col. 5, lines 44-48, "The hardware implementation instructions can include pin assignments, handling configurable I/O buses, communication protocols…host / module I/O.", col. 8, lines 29-35, "A simple device configuration might be used as a special purpose information processor. One or more of user I/O lines can be connected to a simple input device such as a keyboard or…sensor…user I/O lines can be connected to…output device…indicator light or an LED…", col. 14, lines 13-16, "A wide variety of DPU modules can be designed…provide extraordinary functionality and can be used for a very wide variety of applications…", col. 20, lines 15-19, "Other operations are more easily handled in

special hardware, such as ADC, DAC, DSP (measurement functions), video frame buffers, image scanning and printing devices, device interfaces such as automobile engine sensors (automation functions) and controllers (control functions), and other special purpose devices (measurement functions)." Taylor disclosed that a wide variety of program types could be implemented in configurable hardware.)

Per claims 9, 18, 25, 34, 47, 63, 73, 80, and 86:

-the memory stores the test feed-through configuration in a pre-compiled format.

(Taylor: Col. 20, lines 35-37, "...conventional source code program can be converted in whole or in part into a series of specialized circuit configurations...", col. 11, lines 26-27, "...DSP can be used for debugging..." Pre-compiled source code may be used to configure a DSP that can be used for a test feed-through configuration.)

Per claims 10 and 44:

-the program is a graphical program.

(Taylor: Col. 8, lines 29-35, "A simple device configuration might be used as a special purpose information processor. One or more of user I/O lines can be connected to a simple input device such as a keyboard or...sensor...other user I/O lines can be connected to a simple output device such as an indicator...or...display...(graphical program: user input and display output)"

Per claims 11, 43, and 56:

-wherein the program includes one or more I/O primitives,

(Taylor: Col. 5, lines 9-10, "...programmable connections (I/O primitives) to the PLD...", col. 5, lines 44-48, "The hardware implementation instructions can include pin assignments, handling configurable I/O buses, communication protocols between devices...and host/module I/O (I/O primitives).")

-wherein the one or more 1/O primitives are convertible into a portion of a hardware configuration program to invoke the one or more fixed hardware resources,

(Taylor: Col. 27, lines 54-58, "...copy specific DPU configuration code to a specific DPUmod....the stream splitter is aware of the resources available on a specific computer and allocates DPU and other code (convert to hardware configuration program to invoke hardware resources) to maximize utilization of the available resources.")

-wherein the one or more 1/O primitives are executable in the program on the computer system to communicate through the programmable hardware element to the fixed hardware resources.

(Taylor: Col. 12, lines 40-43, "...an array of DPUs can be linked through...buses (I/O primitives communicate through programmable hardware to fixed hardware resources)...to form extensible processing unit (EPU).")

Per claims 12, 19, 27, 40, 53, 75, and 88:

-wherein the programmable hardware element comprises a field programmable gate array (FPGA).

(Taylor: Col. 12, line 48, "...may include any of several types of DPU, including a PGA (a type of FPGA)...")

Per claims 13, 33, and 45:

-wherein the programmable hardware element is configured to implement a processor,

(Taylor: Col. 22, lines 11-15, "...stream splitter splits C program source code into portions: host C source code that is best suited to run on a host CPU (implement a processor)...")

-wherein the device further comprises a memory,

(Taylor: Col. 8, lines 7-8, "DRAM (memory) can be used to store information from EPROM (memory)...")

-wherein a portion of the program is stored in the memory;

(Taylor Col. 7, line 63, "A basic configuration routine can be stored in EPROM...", col. 8, lines 20-22, "...data for several configurations is precalculated and stored (a portion of the program is stored in memory)...")

-wherein the program is compiled for the implemented processor;

(Taylor: Col. 8, lines 17-19, "Configuration data is reloadable according to the source program and current task and application requirements (compiled for the implemented processor).")

-wherein, for debugging purposes, the compiled program is executable on the implemented processor to test performance of the function including the usage of the one or more fixed hardware resources.

(Taylor: Col. 11, lines 25-26, "...DSP can be used for debugging and other functions.", col. 11, lines 1-2, "S-bus can be used to monitor the status of or data in any connected DSP (hardware resources).")

Per claims 14, 42, and 55:

-wherein the one or more fixed hardware resources are operable to provide one or more of a control and data path to the computer system; I/O interfacing to an external system; optimized hardware elements; and basic operating services.

(Taylor: 8, lines 29-35, "...device configuration might be used as a special purpose information processor...I/O lines (control and data path) can be connected to...input device...I/O lines can be connected to...output device such as an indicator light (optimized hardware elements) or an LED numeric display (optimized hardware elements)...")

Per claims 15, 41, and 54:

-wherein the one or more fixed hardware resources comprise fixed hardware including one or more of analog to digital converters (ADCs), digital to analog converters (DACs), and digital lines.

(Taylor: Col. 20, lines 15-19, "...special hardware, such as ADC, DAC...")

Per claims 16 and 46:

A system / method for debugging a measurement program which is usable to configure a reconfigurable measurement device, the system comprising:

-the reconfigurable measurement device comprising:

-a programmable hardware element;

-one or more fixed hardware resources coupled to the programmable hardware element;

-a computer system comprising a processor and a memory;

-wherein the computer system is coupled to the reconfigurable measurement device;

-wherein the memory stores the measurement program specifying a measurement function;

-wherein the programmable hardware element is further configurable with a test feed-through configuration,

-wherein, after configuration with the test feed-through configuration, the programmable hardware element provides for communication between the one or more fixed hardware resources and the measurement program;

-wherein, for debugging purposes, the measurement program is further executable by the processor of the computer system to test performance of the measurement function including the usage of the one or more fixed hardware resources.

(The limitations of claims 16 and 46 are similar to the limitations of claim 1, with the exception that the preamble specifies 'debugging a measurement program" and 'specifying a measurement

function'. Taylor disclosed these limitations in claim 5 above. Therefore, the rejections of claims 1 and 5 above meet the limitations of claims 16 and 46.)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Taylor's invention to include specifically a 'test feed-through configuration' because simulating connected hardware peripherals is important when debugging software that is to be convertible into a hardware configuration program. Taylor disclosed (col. 4, lines 25-29), "A reconfigurable equivalent part can be incorporated in a design, tested, and modified with no or minimal modification to physical hardware, essentially eliminating manufacturing revision costs in designing special purpose computers" and thus the motivation for a 'test feed-through configuration'.

Per claims 17 and 46:

-wherein the measurement program is convertible into a hardware configuration program which specifies a configuration for the programmable hardware element that implements the measurement function,

(Taylor: Col. 8, lines 20-35, "...data for several configurations is precalculated and stored so as to be conveniently loadable into PLD. If, during execution of a program on PLD...instruction requires loading of a different configuration, the...new configuration...can be rapidly loaded...A simple device configuration might be used as a special purpose information processor..." A special purpose information processor (measurement program loaded into a PLD programmable hardware element) is specified from a source program and implements the function.)

-wherein the hardware configuration program further specifies usage of the one or more fixed hardware resources by the programmable hardware element in performing the measurement function

(Taylor, col. 8, lines 24-26, "If, during execution of a program on PLD...instruction(hardware configuration program) requires loading of a different configuration (requires usage of one or more fixed hardware resources), the...new configuration...can be rapidly loaded...)

Per claims 23, 58, and 69:

A system / memory medium for debugging a reconfigurable measurement system, the system comprising:

-a programmable hardware element;

-one or more fixed hardware resources coupled to the programmable hardware element;

-a computer system comprising a processor and a memory;

-wherein the computer system is coupled to the programmable hardware element;

-wherein the memory stores a measurement program specifying a measurement function,

-wherein the measurement program is convertible into a hardware configuration program which specifies a configuration for the programmable hardware element that implements the measurement function,

-wherein the hardware configuration program further specifies usage of the one or more fixed hardware resources by the programmable hardware element in performing the measurement function;

-wherein the programmable hardware element is further configurable with a test feed-through configuration, wherein, after configuration with the test feed-through configuration, the programmable hardware element provides for communication between the one or more fixed hardware resources and the program;

-wherein, for debugging purposes, the measurement program is further executable by the processor of the computer system to test performance of the measurement function including the usage of the one or more fixed hardware resources.

(Taylor: The limitations of claims 23, 58, and 69 are similar to the limitations of claim 1, with the exception that the preamble specifies 'debugging a reconfigurable measurement system". Taylor disclosed 'measurement system' limitations in claim 5 above. Therefore, the rejections of claims 1 and 5 above meet the limitations of claims 23, 58, and 69.)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Taylor's invention to include specifically a 'test feed-through configuration' because he disclosed debugging (col. 11, line 25) and monitoring (col. 11, line 2) connected hardware peripherals. Taylor disclosed (col. 4, lines 25-29), "A reconfigurable equivalent part can be incorporated in a design, tested, and modified with no or minimal modification to physical hardware, essentially eliminating manufacturing revision costs in designing special purpose computers" and thus the motivation for a 'test feed-through configuration'.

Per claim 85:

A memory medium comprised in a computer system, comprising:

-a user interface program which is executable to receive user input specifying a function;

(Taylor: Col. 7, line 54, "Additional traces connect user I/O lines..." User I/O lines for receiving user input. See FIG. 1A: User I/O (user interface program).)

-a configuration generation program which is executable to generate a hardware configuration program based on the user input,

-where the hardware configuration program is deployable on a programmable hardware element,

-wherein the hardware configuration program specifies a configuration for the programmable hardware element that implements the function,

-wherein the hardware configuration program further specifies usage of one or more fixed hardware resources by the programmable hardware element in performing the function;

-a test configuration;

-a deployment program executable to deploy the test configuration onto the programmable hardware element,

-wherein, after configuration with the test configuration, the programmable hardware element provides for communication between the one or more fixed hardware resources and the program;

-wherein the program is executable by a processor in the computer system,

-wherein during execution the program communicates with the one or more fixed hardware resources through the programmable hardware element.

(Taylor: See additional remaining rejection of limitations as addressed in claim 1 above.)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Taylor's invention to include specifically a 'test configuration' because he disclosed debugging (col. 11, line 25) and monitoring (col. 11, line 2) and simulating connected hardware peripherals. Taylor disclosed (col. 4, lines 25-29), "A reconfigurable equivalent part can be incorporated in a design, tested, and modified with no or minimal modification to physical hardware, essentially eliminating manufacturing revision costs in designing special purpose computers" and thus the motivation for a 'test configuration'.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached at (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Mary Steelman

12/07/2004

WEI Y. ZHEN
PRIMARY EXAMINER